REMARKS

It is believed that no fee is required to make this a complete and timely filing. However, if a fee is required, the Commissioner is authorized to charge our Deposit Account No. 19-0733.

Respectfully submitted,

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MARKED-UP VERSION OF AMENDMENT

IN THE TITLE:

Please amend the existing title as follows:

--METHOD AND APPARATUS FOR OVER-THE-AIR ACTIVATION OF NEIGHBORHOOD CORDLESS-TYPE SERVICES--

IN THE SPECIFICATION:

Please amend the paragraph beginning on line 6, page 1 as follows:

This invention relates to the field of providing neighborhood cordless-type services at a single rate such that there is no air time charge for calls made within a home neighborhood zone or subscribed-to visiting neighborhood zone(s), and, more particularly to a method of activating such services over-the-air without any need for service personnel assistance.

Please amend the paragraph beginning on line 4, page 2 as follows:

There is still a need in the art for a wireless service that would permit a mobile subscriber to roam within a zone close to their home in the same way as a 900 MHZ cordless customer is free to carry their cordless phone from room to room. A mobile subscriber should be able to roam and also move from one zone to another or make calls from non-contiguous zones without having to pay for air time charges. In today's cellular environment, airtime is charged. The current fee structure thus has very little incentive for customers to continue to use their cellular phones when they have access to a home-based landline phone. In order to achieve the objectives of one phone, one number anytime and anywhere communications, it is imperative that a neighborhood or local 'cordless-type' of services be provided to all the public cellular/PCS subscribers and with incentive to use the same PCS phone in the home/office and around the neighborhood area without air time charges. A subscriber should not lose a call in progress as they move from one subscribed-to zone to another adjacent subscribed zone, and should have the

opportunity to switch automatically to known DPCS services and pay air time charges should they so choose. A subscriber to such services should be able to activate their service over-the-air from their subscriber to home neighborhood zone without having to obtain service personnel assistance.--

Please amend the paragraph beginning on line 19, page 2 as follows:

TIA/EIA Interim Standard - Addendum No. 1 to TIA/EIA/IS-136.1-A provides suggested messages for an over-the-air activation teleservice, which permits a subscriber to activate cellular service without the intervention of a third party. There is ~~no~~ provision for point-of-sale data entry or preregistration so that a subscriber may be properly validated. Nevertheless, these suggested messages should be preferably supported in an over-the-air activation service.

Please amend the paragraph beginning on line 25, page 2 as follows:

Subscribers to a local cordless-type service according to the present invention may subscribe to a home neighborhood zone and optionally one or more visiting neighborhood zones from which the subscribers may place telephone calls without having to pay air time charges. By local cordless-type service is intended a mobile wireless subscriber loop service wherein stations are mobile and the subscriber ~~susbcriber~~ loop to the customer's premises may be replaced with a wireless loop. The subscriber need not maintain their wired connection to a local exchange carrier (LEC). If the subscribers are current public digital PCS service users, they may use their existing cellular phone and unique mobile identification number (MIN) for subscription to the service. Subscribers may also have the option of electing new wireline numbers to be assigned to their cellular phone for subscription of the service and the numbers assigned may be the traditional PSTN directory number (DN). Alternatively, the subscribers can elect to port their existing wireline DNs to this service. If the subscriber is not a public cellular user, they will need a cellular phone or other mobile station (MS) assigned with either a new DN or their ported DN from the incumbent local exchange carrier (ILEC).

Please amend the paragraph beginning on line 11, page 3 as follows:

The subscriber buys their phone at a retail outlet and the retail outlet records the purchase in a service provider database. The ~~point-of-sale~~ point-of-sale information may include subscriber name, address, credit card number, unique mobile station identification number (MSID), optional personal identification number (PIN) and other verification numbers. Alternatively or in addition, the subscriber may preregister for services with their network service provider of choice. The user ~~activates~~ initiates their service by activating their phone over-the-air when they first communicate from their selected home neighborhood zone. A feature code comprising a part of the over-the-air ~~activatio~~ activation message may comprise one or more of a uniquely chosen sequence of bits, a manufacturer's electronic serial number and a personal identification number (PIN) selected by the user. The system automatically verifies the user by comparing the point-of-sale/preregistration information with the information input by the subscriber from their home neighborhood zone. Over-the-air activation occurs without the assistance of service personal.

Please amend the paragraph beginning on line 18, page 4 as follows:

Figure 1 is a functional block schematic drawing of an exemplary network architecture for providing LCS Local Cordless-type Services (LCS) and for describing call processing.

Please amend the paragraph beginning at line 19, page 5 as follows:

Referring to Figure 1, there is shown an exemplary system architecture for providing local cordless-type services (LCS) according to the present invention. LCS according to the present invention essentially provides a mobile wireless subscriber loop. If a subscriber so chooses, the subscriber ~~subsciber~~ may disconnect their wired ~~telphone~~ telephone service provided by their incumbent local exchange carrier (ILEC) and utilize their same directory number (DN) via the present local cordless-type service. The system architecture of Figure 1 may be overlaid on an existing public switched telephone service network (PSTN) 100 shown above and to the right of a public cellular network cell 101-2 of known cellular wireless service (WS). The LCS service may likewise be overlaid and be provided from the same antenna sites as a conventional cellular wireless service or personal communications service. It is envisioned that the LCS radio equipment (IBS)130-1, 130-2 can also be attached to telephone poles. For ease of

understanding, Figure 1 presents the PSTN 100 as a separate network entity away from the LCS. Thus, Figure 1 is simplified to the extent that the conventional wired PSTN 100 may actually surround and include a local cordless-type services network according to the present invention in much the same way that today a PSTN network 100 surrounds and includes a typical cellular mobile wireless service (WS) network comprising cells 101-1 to 101-7 or digital personal communication service (DPCS) network. As will be further described herein, the LCS service network defines a plurality of neighborhood zones, which may comprise home neighborhood zones (HNZs) 105-1 and visiting neighborhood zones (VNZs) 115-1, 115-2 from the point of view of an individual subscriber to the LCS service of the present invention.

Please amend the paragraph beginning on line 7, page 7 as follows:

A subscriber 10 in a home neighborhood zone (HNZ) 105-1 of wireless service (WS) cell 101-2 may be a PSTN 100 service subscriber and have a hard-wired telephone (not shown) at their residence within the HNZ 105-1. ~~A~~ Llocal cordless-type services according to the present invention ~~is~~ are not limited by the extensive investment in copper cable distribution facilities which will be referred to herein as a wired subscriber loop. That copper investment (made in a PSTN 100 environment) is avoided with local cordless-type services according to the present invention. Thus, LCS service is expected to be less expensive to subscribers than conventional wired PSTN service.

Please amend the paragraph beginning at line 18, page 7 as follows:

According to the present invention of providing local cordless-type services in the same area, subscriber MS 10 may not have wired, fixed location apparatus but may be equipped with a mobile cellular telephone or digital personal communications service telephone, for example, a TIA/EIA/Interim Standard-136 compliant DPCS mobile station (MS) 10. For the same monthly rate or a lower monthly rate than the same subscriber may pay for fixed, wired PSTN 100 service, the subscriber with MS 10 may receive local cordless-type services. Thus, the LCS subscriber will have equivalent, or in many respects superior, features (such as one number type of mobility service) as a wired PSTN subscriber for the same or lower cost.

Please amend the paragraphs beginning at line 26, page 7, ending line 15, page 8, as follows:

Now the present invention of providing a local cordless-type services also differs from a typical cellular telephone service or personal communications service (PCS), in that both of these conventional services charge air time beyond a flat rate for service. In other words, these conventional services apply an additional per-minute charge for use of the radio frequency spectrum. The present invention of providing a local cordless-type services permits unlimited air time within the home neighborhood zone 105-1 and any subscribed visiting neighborhood zone(s), for example VNZ 115-1, 115-2, such that the amount billed per service period is fixed, regardless of the amount of airtime used.

Also, the present invention is comparable with the provision of conventional so-called 900 MHZ cordless handsets, which communicate with a wired home base station. While it is urged by proponents of such apparatus that such phones are portable and may be used as far away as one mile (or more) from associated home base stations, in practice, many such phones are not capable of operating further than hundreds of feet from their wired base stations, for example, because of unfortunate antenna location, the personal use of the mobile handset portion or the placement of the base station or handset portion within a radio frequency shielded residence or automobile or because of other environmental factors. Another limitation for using a 900 MHz phone is that free airtime can only be achieved when using it around the wired home base station. There is no such concept of visiting zone(s) 115-1, 115-2.

Please amend the paragraph beginning at line 9, page 10 as follows:

When subscriber MS 10 roams from HNZ 105-1 into VNZ 115-1 by way of the labeled buffer zones, there will be no charge for airtime and the call in progress will be maintained. When subscriber 10 roams from HNZ 105-1 into VNZ 115-2, then, there is no overlapping buffer zone, the call in progress may or may not be maintained. If the LCS subscriber happens to be also a public ~~PCS/Cellular~~ PCS/cellular service subscriber, the call in progress is handed over to the public PCS/cellular system using public cellular spectrum frequency, there will be no air

time charges for the duration of the same call. There exist at least three alternative embodiments for the subscriber MS 10 that travels outside an HNZ or a VNZ to which they have subscribed. These include 1) allowing the subscriber to continue the call they have initiated or have received without additional charge at least for a predetermined length of time, 2) disconnecting the subscriber from the connection they have for a given call after the subscriber leaves their HNZ or subscribed-to VNZ's or 3) allowing the call to continue outside their HNZ or subscribed-to VNZ's and billing the subscriber for the air time. When the subscriber is within the third alternative, the subscriber may receive a conventional wireless service such as DPCS. As a subscriber reaches a borderline of a subscribed-to zone, the subscriber may see a lit warning lamp, and/or receive an audible or other alert to their status as is further described in copending application, U.S. Patent Application Serial No. ~~TBD~~09/223,320, entitled, "Automatic Status Indicators for Neighborhood Cordless Services," filed on the same day as the present application and invented by A. Chow, R. Miller II, J. Russell, W. Ying, and S. Wang.

Please amend the paragraphs beginning at line 1, page 13 through line 13, as follows:

Referring to subscriber 10 located in HNZ 105-1, there is shown an intelligent base station (IBS) and antenna site 130-2 at the center of the HNZ 105-1 with which subscriber 10 communicates via their DPCS or WS mobile station. The IBSs 130-1, 130-2 and 130-3 each may comprise a digital software radio station that supports an IS-136 based time division multiple access (TDMA) common air interface. For example, each IBS may support three TDMA frames (this comprises ~~of~~ eight IS-136 digital traffic channels, a digital control channel) and four ISDN-BRI (basic rate interface 2B+D) lines for providing up to eight simultaneous telephone calls. Again by way of example, respective links 135-1 and 135-2 may couple IBS and antenna sites 130-1 and 130-2 to remote digital terminals (RDT) (only a single RDT ~~180~~178 is shown by way of example), for traffic concentration or relay of the calls to a local digital ~~subscriber~~ switch (LDS) 140-2 via a GR-303 trunk interface 185, as appropriate. GR-303 relates, for example, to a known remote terminal (RDT) to local digital switch interface comprising an integrated digital loop carrier system and associated requirements. In an alternative embodiment, the IBS 130-3 may communicate directly via ISDN BRI link 135-3 to a local digital switch 140-1.

LDS 140-1 or 140-2 may preferably comprise any ~~digital~~ local digital switch known in the art including, but not limited to, a No. 5 ESS switch manufactured by Lucent Technologies, Inc., or a DMS-100 switch manufactured by Northern Telecom which is also called a digital telecommunications switch in the art. These switches perform the switching function necessary to connect LCS subscribers to PSTN customers, WS customers, PCS or DPCS customers or other LCS subscribers wherever situated. A network server platform (NSP) (e.g., NSP 145-1, 145-2) of an LCS system may be an adjunct to each LDS 140-1 and 140-2. The NSP may preferably comprise a pair of fully redundant (i.e., for hot standby fault tolerance) Sun Sparc work stations available from Sun Microsystems or other comparable processor programmed as will be further described herein for registration, call processing, and/or call hand-off. Each NSP will have an intelligent database (ID) containing subscriber profile information. Each site may be backed-up by an intelligent spare NSP and ID and program memory backed up on disc or other memory back-up. In Figure 1, LDS ~~LCS subscriber switch~~ 140-2 is coupled to NSP 145-1 and LDS ~~LCS subscriber switch~~ 140-1 is coupled to NSP 145-2. Each NSP operates to effectively control all activities associated with subscriber registration, call setup and tear down, radio frequency engineering, handoffs, feature applications, and operation, administration and maintenance (OA&M) functions. Each respective NSP for a LDS ~~LCS subscriber switch~~ manages all its subtending IBS's and antenna sites. In the depicted example, a single LDS ~~LCS subscriber switch~~ 140-2 and NSP 145-1 may serve multiple neighborhood zones, in this instance, HNZ 105-1 and VNZ 115-1. The number of zones served by a single NSP need not be limited to two but may comprise 3 or more.

Preferably, all NSP's are linked together for communication via, for example, an IP-based LCS intranet or virtual private network (VPN) comprising of a router 165. During operation, the IP-based network is utilized for passing call and subscriber registration, mobility management and LCS Operation Administration & Maintenance (OA&M) related information. Also coupled via the IP-based intranet or VPN are connections to an authentication center (AC) 190, to a LCS Customer Service Center (CSC) 160, a network management and operations center (not shown), and a operations support systems center (not shown).

Please amend the paragraph beginning at line 17, on page 14 as follows:

The LCS authentication center (AC) 190 may be a shared resource of the LCS network as is the LCS CSC 160. As will be further described herein, a subscriber to LCS may preserve their directory numbers (DN) if they disconnect their wired PSTN number and connect to LCS service. The LCS AC 190 may utilize IS-136 cellular authentication voice encryption (CAVE) to assist in validating and authenticating subscribers and to provide voice privacy and encryption capabilities. ACAC Gateway (GW) 170 sits within the IP-based LCS intranet or VPN 110 and provides a TCP/IP data link to the SS7 network 120. This IP-based network, as explained above, provides access to and interworks with the home location register for registration of MIN-based LCS subscribers for delivery of calls, for example, from subscriber 150 to LCS subscribers within the neighborhood zones 115-1, 115-2 and 105-1. The GW 170 is responsible for the TCP/IP to SS7/TCAP protocol conversion between the SS7 network and the LCS network. The GW 170 is also responsible for global location management on a per NSP 145 location basis, for example, MIN-based call delivery. The AC 190 supports registration of subscribers, over-the-air activation and call hand-off.

Please amend the paragraph beginning at line 24 on page 15 as follows:

The intelligent base station (IBS) can be any currently existing radio base station that is known in the art. The IBS should be capable of performing automatic frequency allocation functions, which are known in the art. For this invention, the preferred embodiment further provides self-configuration in accordance with US Patent No 5,724,665. Other patents utilized in the design of IBS 130 include US Patent No.'s 5,608,780; 5,592,470; 5,574,775 and

5,406,615. Referring to Figure 2, there is shown a generalized software radio architecture for an IBS 130 shown in Figure 1. Line 201 may be an ISDN BRI line as shown or other equivalent data line. Line 201, although not shown, may be coupled via a remote digital terminal ~~180~~178 to a LDS ~~switch~~ 140 or directly to the switch per Figure 1. Line 201 is connected to a communications processor of processing module 270. Communications processor 272 handles all wire line interface control functions. The communications processor is coupled to a network compatibility processing module for handling incoming and outgoing calls requiring either LCS or DPCS or other network compatibility. Main controller 274 is coupled to a source/error correction coding/decoding module 230 and a channel coding module 240. A frequency reference or clock 276 is divided to provide all the reference frequencies needed by any other module including channel coding module 240.

Please amend the paragraphs beginning at line 8 through line 20 on page 17 as follows:

On the air interface side, in this embodiment, each IBS has 9 full-rate TDMA channels. Note: Number of full rate channels for the IBS should be made as a variable for this patent, since the number of radio channels per radio port can be designed according to different services applications and coverage density requirements. IBS can provide as many radio channels as long as it meets the design and service deployment financial criteria. Among these channels, one full-rate channel will be designated as the Digital Control Channel (DCCH) and the remaining 8 channels will be used as the Digital Traffic Channel (DTC). In order to support up to 8 simultaneous conversations, for instance, four ISDN-BRI lines may be used to connect the IBS 130 to the LDS ~~LCS local switch~~ 140 (Figure 1). Therefore, an IBS with 8 DTCs can support up

to 8 simultaneous calls. When a user subscribes to the LCS services as a DN-based user, the subscriber will be given a DN during registration or service activation (that is, each DN is assigned with a TEI designated to an IBS) and the MS is in effect assigned to a specific IBS in the subscribed HNZ for call delivery purposes. For example, subscriber 10 will be assigned to IBS 130-2.

Referring again to Figure 1, since IBS 130 will be connected to an LDS ~~LCS local digital switch~~ such as the No. 5 ESS or DMS-100 digital switch 140, a DN based network switching element, the call routing between the local digital switch and the IBS must also be DN-based. The LCS service may use Cellular/DPCS RF infrastructure that is a MSC/MIN based switching platform. Therefore, these two different switching algorithms creates alternative call delivery scenarios for LCS calls. Consider the following LCS call delivery scenarios.

Please amend the paragraph beginning at line 20 on page 19 as follows:

A new LCS subscriber may purchase MS apparatus at a retail outlet, preferably, an IS-136 compliant mobile station set with a display. The subscriber buys their phone at a retail outlet and the retail outlet records the purchase in a service provider database, ID 146. Manufacturers may or may not provide retail outlets with secure information of the electronic manufacturer's serial number which is secret to the purchaser. A retailer may register a subscriber with a chosen network service provider. The ~~point-of-sale~~ point-of-sale information may include subscriber name, address, credit card number, home directory number (DN), unique electronic serial identification number (MSID), optional personal identification number (PIN) and other verification number. Subscriber data will be referred to herein as a subscriber profile preferably ~~mainained~~ maintained at an NSP ID 146. The new subscriber then may alternatively or in addition dial a telephone number provided for customer service center (LCS CSC) 160 and is connected to a service representative or a voice interactive response unit known in the art to preregister for services. While a subscriber or retailer can dial from a retail outlet, causing the subscriber to call ~~LSC~~ LCS CSC 160 provides an additional validation of subscriber data as a

subscriber profile is built. For example, an ANI check can compare a point-of-sale entered DN against a dialed number recovered via ANI and reported at a CSC 160. Either the device or a service representative may welcome the new subscriber's call and thank the new subscriber for subscribing to LCS. Either may then request of the subscriber their personal profile data for verifying or completing their subscriber profile which may be verified by known processes with point-of-sale data. The new subscriber is requested to particularly select an option for addressing: 1) do they wish to disconnect their wired PSTN service and reuse the associated DN, 2) obtain a new LCS number or 3) use their MIN from an existing mobile wireless service. The subscriber is also advised of the rate selection opportunities and boundaries of neighborhood zones they may be interested in.

Please amend the paragraph beginning on line 18 on page 21, ending line 14, page 23, as follows:

In order for the subscriber to actuate their LCS service, they should be in their selected HNZ 105. For example, new subscriber MS 10 must be in the boundaries of their HNZ 105-1. Subscriber 10 then turns on their MS 10 and enters their unique bit sequence and/or PIN. (The PIN may be used in a similar manner to the manner that PIN's are presently used in wireless services generally, namely, to promote call security and prevent service piracy and, consequently, may be optional). The preamble consists of the MS locking onto the IBS 130-2, transmitting an IS-136 Origination message including the feature code/PIN to the IBS 130-2 and IBS 130-2 forwarding the message via RDT 178 ~~RT 180~~, GR-303 link 185, and local digital switch 140-2 to its associated intelligent switch controller (NSP) 145-1. The MS 10 generates the feature code FC portion of the message from the stored unique MSID, the unique bit sequence given the subscriber (which they enter by using their phone keypad) and their PIN (also using the keypad). The order of bits in the FC should be predetermined so that the FC can be decoded at the NSP. Since the ID 146-1, after the subscriber registration process is completed, should have the subscriber profile stored for that subscriber including their feature code, unique bit sequence and/or PIN, the NSP 145-1 validates the MS by comparing the entered feature code including PIN with data stored in the ID 146-1. A further validation may include the comparison

of a collected electronic serial number of the MS with an associated database entry if obtainable from the manufacturer or the retail outlet that sold the phone. If there is no match of all or any of the two (or three), a message may be returned to suggest the subscriber contact LCS CSC 160. After the NSP 145-1 verifies that the subscriber profile is in the ID 146-1, it initiates OATS to activate the MS by sending the Configuration Data Request message to the MS via IBS 130-2. The MS responds with Configuration Data Response to the NSP 145-1 via IBS 130-2. Altogether the preamble and the configuration data request and response comprise process step "a" shown in Fig. 3.

As shown in Figure 3 step ~~b~~"b", once a download request message is received by MS, a download response requesting a download is transmitted to NSP 145-1. This message includes a request for the downloading of all algorithms and data necessary for LCS service including a number assignment module (NAM) giving the MS its subscriber opted-for address (MIN or DN). After the NSP receives the download response message, step "c" begins and a NAM commit request message is transmitted to the MS. This message instructs the MS to program/populate and commit a designated number assignment module area of memory (NAM(x)) with the downloaded data. If a subscriber decides to use their directory number as the number to be called, NAM(x) will be designated for LCS DN programming, and likewise if the subscriber decides to use their MIN as their reach number, NAM(x) will be designated for LCS MIN programming. Now the registration processes will be discussed for each of the options of MIN or DN based LCS service and when either must register in a visiting neighborhood zone to which the subscriber has subscribed. These processes are carried out in real-time.

Registration Process for a MIN-Based MS

Referring to Figure 4a, there are shown steps "a", "b", "c" and associated with registration processes for a MIN-based subscriber in their home neighborhood zone. In step "a", the DCCH process consists of IBS 130 broadcasting system-wide and IBS 130 specific parameters (such as system and IBS 130 identification) on its DCCH and the MS 10 locking onto the DCCH when the MS 10 powers up. The MS 10 sends an IS-136 registration message to the IBS 130. IBS 130 forwards the registration message to its associated NSP 145 via the LDS~~LCS~~ local switch 140. This message contains IS-136 registration data.

In step "b" the home zone NSP 145 checks the MS's status with its Intelligent Database (ID) 146 and determines that the MS is a valid MIN-based LCS service subscriber. Since the MS is MIN-based, NSP must interact with the WS HLR for the registration process. If the optional MS authentication is required (this is determined by the LCS service provider and indicated to the MS 10 as one of the DCCH broadcast parameters), the MS IS-136 Registration message will include the authentication information. The NSP 145 will initiate the authentication procedure with LCS AC ~~140~~190 by sending an authentication message via router 165. The NSP 145 sends an IP-based message containing IS-41-like authentication information to the LCS AC. After successful authentication of the MS, the LCS AC sends an IP-based IS-41-like *auth~~req~~* message back to the NSP 145.

Please amend the paragraph beginning on line 21, at page 23 as follows:

After a successful registration, the HLR 175-2 sends an SS7/TCAP/IS-41 *regnot* message back to the GW 170. The GW receives the IS-41 *regnot* message, translates the message into a TCP/IP based registration accept *req accept* message. Since the GW 170 stores each NSP 145 unique IP address based on information gathered during MS registration message, the GW sends the registration accept *req accept* message back to NSP 145 based on the NSP's unique IP address. The NSP 145 processes the registration accept *req accept* message and sends it to the IBS 130. NSP 145 notes that the mobile is successfully registered and active.

Please amend the paragraphs beginning on line 17, at page 24, ending line 3, page 25, as follows:

The signaling flow shown in Figure 4b describes the scenario where a DN-based MS 10 registers that requires just two steps "a" and "b". In step "a" the DCCH process consists of H-IBS 130 broadcasting system-wide and H-IBS 130 specific parameters (such as system and H-IBS 130 identification) on its DCCH and the MS locking onto the DCCH when the MS powers up. The MS sends an IS-136 registration message to the home zone H-IBS 130. The H-IBS 130 forwards the registration message to the H-NSP 145 via the ~~LCS local switch~~ LDS 140. This message contains IS-136 registration data.

In step "b" the H-NSP 145 checks the MS's status with the Intelligent Database (ID) 146 which already has the subscriber profile, determines that the MS 10 is a valid DN-based LCS subscriber. If the optional authentication procedure is required (as determined by the LCS service provider), the H-NSP 145 sends an IS-41-like AUTHREQ message in IP format to the LCS Authentication Center (AC) 190 in order to authenticate the mobile. When the authentication process is successful, the AC 190 returns an authentication request response message *auth req* to the H-NSP 145. The H-NSP 145 sends the reg. accept message to the H-IBS 130. The H-IBS 130 sends an IS-136 Reg. Accept message to the MS to complete the MS registration procedures.

Please amend the paragraph beginning on line 14, at page 25 as follows:

In step "b" the V-NSP 145-2 checks the MS's status with the Intelligent Database ID 146-2 which has the subscriber profile previously downloaded by the LCS CSC 160 and determines that the MS is a valid DN-based LCS subscriber. The V-NSP ~~140-1~~ 145-2 sends an IS-41-like *authreq* message in IP format to the AC 190 for subscriber authentication. The AC190 validates the subscriber with its internal database and returns an *authreq* response message back to the V-NSP 145-2.

Please amend the paragraph beginning on line 4, at page 26, as follows:

The call delivery process from an originating switch in the PSTN 100 to a MIN-based LCS subscriber are shown in Figure 5a. To the extent possible, similar reference characters are borrowed from Figure 1 to represent similar elements for an incoming call to subscriber MS 10. Process step "a" takes the incoming call request to the home zone NSP 145-1. The LDS ~~PSTN switch~~ 140-3 of PSTN 100 processes the MIN-based incoming call and sends an ISUP Initial Address Message (IAM) to a PSTN-based MSC 180. The MSC 180 provides services and coordination between mobile users in the public cellular network and between the mobile users and the external network such as PSTN 100. When a PSTN user dials a MIN, the PSTN LDS will always route the call to the MSC switch for call delivery. One way to look at the phone networks including PSTN 100, public cellular network and LCS is that all the switches from each network are fully connected and they all have connections to the Common Signaling

Network Number 7 (SS7). The Mobile Switching Center, MSC 180, provides switching functions for the cellular network and coordinates the establishments of calls to and from cellular/DPCS subscriber. The MSC interfaces with the cellular network(s) and the public switch networks. Since the MSC does not have the MIN-based user currently registered, the MSC sends a SS7/TCAP/IS-41 location request (LOCREQ) message to HLR 175-2. The HLR 175-2 knows the current registration location of the MIN-based MS because of prior registration notification from the home zone NSP (H-NSP) 145-1 via the gateway (GW) 170. HLR 175-2 sends a SS7/TCAP/IS-41 route request (ROUTREQ) message to the H-NSP 145-1 via the GW 170 for routing instructions to the MS 10. The GW 170 translates the message to an IP message and sends it to the H-NSP 145-1 (ROUTE REQ (MIN)). This completes process step "a".

Please amend the paragraphs beginning on line 4, page 27, ending line17 page 28, as follows:

Process step "c" takes the call from HLR 175-2 to a set-up request of H-IBS 130-2. The HLR returns the reserved FDN information in the IS-41 TCAP *locreq* response message to the MSC. The MSC 180 initiates call setup by sending an ISUP IAM message to the ~~LCS switch(LDS)~~ LDS 140-2 based on the FDN. The ~~LCS switch (LDS)~~LDS 140-2 sends a Q.931 call setup message to the H-IBS 130-2 based on the reserved DN. This concludes process "c".

Process step "d" relates to acknowledgment. The H-IBS 130-2 sends a call request message to the H-NSP 145-2 to validate the call request. Note: H-NSP 145-1 may initiate IS-136 authentication procedure when necessary. The H-NSP 145-1 uses the ID database 146-1 to locate the record of FDN-to-MIN mapping to validate the call. If the request is valid and RF resources are available, H-NSP 145-~~2~~1 will reserve a digital traffic channel (DTC) for call delivery. H-NSP 145-1 then sends a call request *ack* message with the MIN, DTC, and B-channel (reserved when the FDN was assigned to the call) to the H-IBS 130-2. If the call request is not valid or no resources are available, the H-NSP 145-~~2~~1 will return a call request *nack* (stands for negative acknowledgment) and the H-IBS 130-2 will release the call. This concludes process "d".

In process step "e", the H-IBS 130-2 starts to page the MIN-based MS 10. H-NSPH-IBS (Note: The IS-136 MS paging process is as follows: the H-IBS 130-2 broadcasts an IS-136 page

for the MIN-based MS 10. The MS 10 must respond with an IS-136 page response message within a specified time period. If the MS 10 does not respond, the H-IBS 130-2 will release the call.) After the MS 10 successfully responds to the page, the H-IBS 130-2 sends a Q.931 call proceeding message to the ~~LCS switch~~LDS 140-2 ~~LCS~~.

In process step "f", the H-IBS 130-2 sends a DTC designation message to the MS 10 and verifies the MS is on the DTC by monitoring the returning DVCC code status change. After the MS 10 locks onto the DTC (DVCC status change), the H-IBS 130-2 sends an IS-136 alert with info message to the MS 10 to initiate a ringing indication to the user. H-IBS 130-2 also sends a Q.931 alert message to the ~~LCS switch~~ LDS 140-2. The LDS 140-2 sends an ISUP address complete message (ACM) to the MSC to complete the end-to-end call connection. The MSC 180 sends an ISUP ACM message to the PSTN 100.

Process step "g" is similar to a cellular/DPCS connect process. The ~~LCS local switch~~ LDS 140-2 generates alerting (ring back tone) to the originating user. When the MIN-based user 10 picks up the call and the MS 10 sends an IS-136 connect message to the H-IBS 130-2, the H-IBS 130-2 sends a Q.931 connect message to the ~~LCS local switch~~ LDS 140-2. The ~~LCS~~ switch LDS 140-2 sends an ISUP address answer message (ANM) to the MSC. The MSC 180 sends an ISUP ANM message to the PSTN switch ~~140-3~~100, the PSTN switch ~~140-3~~ connects the caller and thus the voice path is established and completes the call delivery process.

Call Delivery to a DN-based Subscriber, the DN Being Assigned for LCS

Figure 5b describes the signaling flow scenario of a PSTN caller dialing the LCS subscriber's DN when the DN is registered with the H-IBS in the HNZ. In step "a" an originating PSTN switch (somewhere in PSTN 100) processes the DN-based incoming call and sends an ISUP IAM message to the HNZ ~~LCS local switch~~ LDS (H-LDS ~~H-LDS~~) 140-2 based on the DN dialed. The H-LDS 140-2 sends a Q.931 call setup message to the H-IBS 130-2 based on the DN dialed. The H-IBS 130-2 sends a CALL REQUEST message to the H-NSP 145-1 to validate the call request. The H-NSP 145-1 may initiate an authentication procedure with an AC 190 when and if necessary.

Please amend the paragraph beginning on line 27, page 28 as follows:

After successfully paging the MS, the H-IBS 130-2 then sends a Q.931 call proceeding message to the ~~H-LDS~~ H-LDS 140-2. This connects the B-channel to the H-LDS 140-2.

Please amend the paragraph beginning on line 13, page 29 as follows:

The called MS's DN may be registered with a visited V-NSP, for example, V-NSP 145-2 in the VNZ 115-2. Referring to Figure 5c, step "a" the originating PSTN switch processes the DN-based incoming call by sending an ISUP Initial Address Message (IAM) to the H-LDS 140-2 based on the DN dialed. The H-NSP 145-1~~LDS 140-2~~ sends a Q.931 call setup message to the ~~IBS 130-2~~ H-LDS 140-2 based on the DN dialed. The H-IBS 130-2 sends a CALL REQUEST message to the H-NSP 145-1 to validate the call request. The H-NSP 145-1 may initiate authentication procedure when necessary with AC 190.

Please amend the paragraph beginning on line 16, at page 31 as follows:

In step "b" the originating PSTN switch receives the LRN reply message, processes the message and uses the information for call routing. The PSTN switch sends an ISUP IAM message to the HNZ LDS ~~LCS local switch~~ (H-LDS) 140-2 based on the LRN reply. The H-LDS 140-2 sends a Q.931 call setup message to the H-IBS 130-2 based on DN.

Please amend the paragraph beginning on line 23, at page 32 as follows:

In step "b" the originating PSTN switch receives the LRN reply message, processes the message and uses the information for call routing. The PSTN switch sends an ISUP IAM message to the HNZ ~~LCS local switch~~ LDS (H-LDS) 140-2 based on LRN reply. The H-LDS 140-2 sends a Q.931 setup message to the H-IBS 130-2 based on the DN. The H-IBS 130-2 sends a CALL REQUEST message to the H-NSP 145-1 to validate the call.

Please amend the paragraphs beginning on line 17, at page 33,ending line 9, page 34 as follows:

In step "e" the V-LDS 140-1 now has the call. V-LDS 140-1 sends a Q.931 setup message to

the V-IBS 130-3 based on the FDN. The V-IBS 130-3 sends a call request message to the V-NSP 145-2 to validate the call. As before, the V-NSP 145-2 may initiate authentication procedures via an authentication center when and if necessary. The V~~H~~-NSP 145-2 uses the ID database 146-2 to locate the record of FDN-to-DN mapping to validate the call. If the request is valid and resources are available, V-NSP 145-2 will reserve the DTC and the B-channel (reserved when the FDN was assigned to the call). V-NSP 145-2 then sends a call request *ack* message with the resource information to the V-IBS 130-3. V-IBS 130-3 starts to page the DN-based MS. If the call request is not valid or no resources are available, the V-NSP 145-2 will return a call request *nack* and the V-IBS 130-3 will reject the call. Briefly, the IS-136 MS paging process is as follows: the V-IBS 130-3 broadcasts an IS-136 page for the DN-based MS. The MS must respond with an IS-136 page response within a specified time period. If the MS does not respond, the V-IBS 130-3 will release the call. The V-IBS 130-3 sends a Q.931 call proceeding message to the V-LDS 140-1 after successfully paging the MS. This connects the B-channel to the V-LDS 140-1.

In step "f" the V-IBS 130-3 sends a DTC designation message to the MS and verifies the MS is on the DTC by monitoring the returning DVCC code status change. After the MS locks onto the DTC (DVCC status change), the V-IBS 130-3 sends an IS-136 alert with info message to the MS to indicate ringing to the user. It also sends a Q.931 alert message to the V-LDS 140-1. The V-LDS 140-1 sends an ISUP address complete message (ACM) to the H-LDS 140-2, and the H-LDS 140-2 sends an ISUP ACM message to the PSTN 100 originating switch to complete the end-to-end connection. The V-LDS 140-1 generates the alerting (ring back tone) to the originating user.

Please amend the paragraphs beginning on line 21, at page 34, ending line 2, page 35 as follows:

Referring to Figure 5f, step ~~a~~ "a", a PSTN user dials a LCS subscriber's DN. The LDS 140 receives the ISUP IAM message from PSTN. The incoming call to a TAT provisioned DN

directs the LDS 140 to request for routing instructions from H-NSP. H-NSP finds that the subscriber's MS is active in an IBS, and pages H-IBS, which pages MS 10 ~~the MS 10~~.

In step ~~b~~"b", after the MS 10 responds to the page , via H-IBS, H-NSP directs LDS to forward the call to the FDN of the serving IBS via a TCAP (AIN Authorize – Term ~~DN~~).

In step ~~c~~"c", LDS 140 sends Q.931 Setup message to the IBS. IBS sends Digital Traffic Channel (DTC) Designation message to MS 10 and sends Q.931 Call Proceeding message to the LDS. MS tunes to the traffic channel. IBS then detects the MS is on the traffic channel via DVCC status change. IBS 130 alerts the MS 10 and the MS 10 acknowledges.

Please amend the paragraph beginning on line 3, at page 35 as follows:

In step ~~d~~"d", IBS 130 sends ISDN Alerting message to LDS. LDS 140 sends an ISUP ACM message to the PSTN and an alerting ringback to the calling mobile station. When the MS answers, IBS sends ~~ISDN~~ Q.931 Connect message to LDS. LDS then sends ISUP ANM message to PSTN switch and cuts through the voice path.

Please amend the paragraphs beginning on line 26, at page 37, ending line 20, page 38 as follows:

In step ~~b~~"b", when H-IBS 130-2 detects a handoff condition based on the received channel quality messages (a low threshold value is reached), the H-IBS 130-2 sends a handoff request message. This message includes a priority list of the neighboring IBSs (V-IBS) such as V-IBS 130-1 along with the serving mobile MSID to the H-NSP 145-1. H-IBS 130-2 also starts the handoff request timer (T1). Once the H-NSP 145-1 receives the handoff request message, the H-NSP 145-1 will start at the top of the neighboring IBS (V-IBS) list and check the radio channel

and B-channel availability of each entry. When an available neighboring IBS (V-IBS), such as V-IBS 130-1 is found, H-NSP 130-2 will request the V-IBS 130-1 to prepare for a handoff for the MS (MSID) and starts timer T2. In response, the V-IBS 130-1 will reserve the B-channel and the RF resources and start to initiate a three-way call using the directed call pickup with barge-in. IBS_n sends a Q.931 Setup message to LDS 140-2 that includes a feature activation code for DPU and the DN for the IBS 130 to barge-in upon, IBS_o. IBS_n 130-1 then waits for the LDS to indicate that the call has connected to IBS_o 130-2 via Q.931 set up ACK, Q.931 call Proceeding and Q.931 Connect. IBS_n 130-1 then sends a Handoff Directive to IBS_o 130-2 to inform the IBS that IBS_n 130-1 has successfully established a three-way call (DPU) as well as sending a Q.931 Connect ACK to LDS 140.

In step e"c", after receiving the Handoff Directive, IBS_o 130-2 cancels timer T1. IBS_o sends an IS-136 Handoff order to the MS requesting it to retune to the new RF channel on IBS_n 130-1. After the MS acknowledges the order, IBS_o 130-2 starts to release the ISDN B-channel via Q.931 disconnect. LDS 140-2 returns a Q.931 release to IBS_o 130-2, which then sends Q.931 release complete to LDS 140-2. ~~and s~~Simultaneously IBS_o 130-2 informs H-NSP145-1 that it has completed the handoff to the new IBS, IBS_n 130-1. H-NSP 145-1 acknowledges this notification.

In step ~~d~~"d", when the MS arrives on the new channel, detected by IBS_n 130-1 by the DVCC status change, IBS_n 130-1 sends a Handoff Result message to H-NSP 145-1. H-NSP 145-1 notes that the handoff is completed to the new IBS and cancels timer T2. Voice path is established via a new route and the call continues.

Please amend the paragraph beginning on line 6, at page 39 as follows:

In step "b" the IBS 130-2 sends a Q.931 call setup message to the ~~LCS local switch~~ LDS 140-2. The LDS 140-2 sends an ISUP IAM message to the destination switch in the PSTN 100 to initiate end-to-end connection. The LDS 140-2 sends a Q.931 call proceeding message to the IBS 130-2 to connect the B-channel to the LDS 140-2.

Please amend the paragraph beginning on line 18, at page 39 as follows:

Thus, there has been described a complete system for providing a new local cordless-type services where a mobile subscriber may receive and make free calls within their subscribed-to neighborhood zones.

Please amend the paragraph beginning on line 21, at page 39 as follows:

All United States patents referred to herein should be deemed to be incorporated by reference as to their entire contents. The following copending patent applications, which have each been filed on the same day as the present application ~~(the third one listed below being the present application)~~, are hereby incorporated by reference as to their entire contents:

Please amend the paragraph beginning on line 25, at page 39 as follows:

- U.S. Patent Application Serial No. ~~TBD~~ 09/223,322 (Attorney Docket No. 03493.75951; Client Reference No. Chow 4-41-40-10-2), entitled "Neighborhood Residential Cordless Services," invented by A. Chow et al.

Please amend the paragraph beginning on line 1, at page 40 as follows:

- U.S. Patent Application Serial No. ~~TBD~~ 09/223,320 (Attorney Docket No. 03493.76142; Client Reference No. Chow 3-40-39-9-1), entitled "Automatic Status Indicators for Neighborhood Cordless Services," invented by A. Chow et al.

~~Please amend the paragraph beginning on line 4, at page 40 as follows:~~

~~- U.S. Patent Application Serial No. TBD (Attorney Docket No. 03493.77803; Client Reference No. Chow 10-1-7), entitled "Using Over the Air Activation Tele Service (OATS)...," invented by Chow et al.~~

Please amend the paragraph beginning on line 7, at page 40 as follows:

- U.S. Patent Application Serial No. ~~TBD~~ 09/223,321 (Attorney Docket No. 03493.77824; Client Reference No. Chow 12-8-10), entitled "Automatic Service Selection Feature," invented by Chow et al.

Please amend the paragraph beginning on line 10, at page 40 as follows:

- U.S. Patent Application Serial No. ~~TBD~~ 09/223,317 (Attorney Docket No. 03493.77825; Client Reference No. Chow 11-41-2-8), entitled "Method for Billing Subscribers With Neighborhood Cordless Residential Service," invented by Chow et al.--

Please amend the paragraph beginning on line 13, at page 40 as follows:

- U.S. Patent Application Serial No. ~~TBD~~ 09/223,316 (Attorney Docket No. 03493.77826; Client Reference No. Chow 6-1-3-3), entitled "Neighborhood Residential Cordless Service Call Handoff With Call Barging," invented by Chow et al.

IN THE CLAIMS:

Claims 16-60 have been added.

IN THE ABSTRACT:

Please amend the Abstract as follows:

A method for providing a local cordless-type service comprises the steps of receiving subscriber neighborhood zone selection input so that a mobile telephone equipped subscriber may place or receive calls for a fixed rate, for example, per month without having to pay radio frequency air time charges any time they are located within their selected subscribed-to zones. If the subscribed-to zones are adjacent to one another and the mobile subscriber roams from one zone to another, the subscriber may continue their free call uninterrupted and without paying air time charges. However, when the subscriber roams outside their subscribed-to zones they may be switched from the present local cordless-type services to conventional personal communications services and pay air time charges. However for an active call, no air-time charges are incurred as the user transitions between the cellular/DPCS environment and the local cordless service environment. Associated apparatus comprises an IBS for automatically changing radio frequency channels as the subscriber roams within a subscribed-to neighborhood zone, roams to another subscribed-to zone or roams outside a subscribed-to zone. Subscribers may choose to use their mobile identification number, their current directory telephone number for wired public switched telephone service or obtain a new directory number. Subscribers can actuate their service over-the-air automatically without service personnel assistance from their home neighborhood zone.